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5. The number of top minnows necessary in a body of water in order to secure mosquito control depends largely upon the conditions which prevail with respect to places of protection, i. e., a much smaller number of *Gambusia* is necessary, if the water is fairly free of hiding places for mosquito larvæ against fish, than if the reverse is true.

ANTENATAL AND NEONATAL FACTORS IN INFANT MORTALITY.

An extraordinarily helpful analysis of some of the causes of infant mortality is presented by Ballantyne in an article entitled "Antenatal and neonatal factors in infantile mortality," published in *Maternal and Child Welfare*, October, 1918. Inasmuch as a correct understanding of these factors underlies all effective preventive measures undertaken by health officers to lower the infantile death rate, we reproduce here the following abstract of this valuable analysis:

The author points out that at the very center of the problem of the reduction of infantile mortality lie the evaluation and analysis of the causal factors which are responsible for that loss of young lives which is still, notwithstanding all that has been accomplished in prevention and treatment, only to be fitly characterized as appalling.

On account of the defects in statistics it is not possible to know what is the total loss of young life which occurs before birth, at birth, and during the first year after birth. Some babies die in the first year of life from postnatal causes, such as the various zymotic maladies, improper feeding, defective housing, etc. Others die because of antenatal conditions, such as prematurity of birth, congenital malformations, debility, etc. Not a few die from both antenatal and postnatal causes. It is in the first month of life that these two factors tend to unite in their attack upon the newborn infant. It is at this age, after birth, that the antenatal factor is acting most powerfully, and it is at this time also, that the postnatal factor has a character which differs so markedly from that which it possesses later. Somewhere between one-third and one-half of all the deaths which occur in the first year of life take place in the first four weeks of it. Obviously, the neonatal period is a most critical one. If deaths were evenly distributed over the first year of life, one-thirteenth of them should occur in these first four weeks; but instead of that, never less than one-third of them occur then. If the fatalities of the first 4 weeks were to be continued during the remaining 48 weeks, the infantile mortality rate for the first year of life would be over 500 per thousand live births instead of 100, which it is at the present time. On the other hand, if the deaths in the first 4 weeks were to be reduced to the same proportion as those during the subsequent 48 weeks the

infantile mortality rate would fall to something like 70 per thousand live births. The first four weeks, therefore, have an importance which can hardly be overestimated.

Suggested New Rates in Statistics.

The author suggests the use of the following new rates in studying infant mortality:

- (a) Conception rate.
- (b) Miscarriage rate.
- (c) Stillbirth rate.
- (d) Neonatal death rate.

Under (c) the author urges that it be made possible to state (1) how many of stillbirths were prematurely born and how many had reached the full term, and (2) in how many stillbirths did the death of the unborn infant precede the confinement of the mother, and in how many was it coincident with and caused by it.

Then, there must be a differentiation made between the stillbirths which are prematurely born and those which have reached the full term; in other words, there will have to be a premature stillbirth rate and a mature stillbirth rate. Further, it must be made possible to separate the stillbirths which have died before labor from those which died in labor and to construct a rate for each; the former will be the antenatal stillbirth rate, and the latter the intranatal stillbirth rate; the former will depend mainly upon the maternal health in pregnancy, and the latter mainly upon the obstetric assistance which the mother gets in her confinement.

In discussing (d), the neonatal death rate, the author urges an intensive study of the deaths which occur in the first four weeks of life.

In all mortality tables the neonatal deaths must be stated separately from those occurring in the first 12 months. The neonatal mortality rate may be calculated in various ways. The one suggested is that the proportion of deaths per thousand live births which occur in the first four weeks of life should constitute the rate. It might perhaps be better to include the stillbirths which occur intranatally, but in the meantime their inclusion would complicate matters. Again, the rate might be that for the first month of life instead of that for the first four weeks; but the objection to that is that a month is less definite than four weeks, and the results would be vitiated for purposes of comparison. The rate suggested is that for one-thirteenth of the time included within the infantile mortality rate, that is for 4 weeks out of 52.

Lessons from the Edinburgh Neonatal Mortality Rates.

The following table gives the Edinburgh birth rates, infantile death rates, and neonatal death rates for the years 1911 to 1917, inclusive:

Year.	Birth rate.	Infantile death rate.	Neonatal death rate.	Year.	Birth rate.	Infantile death rate.	Neonatal death rate.
1911.....	20.8	115	42.2	1915.....	17.8	132	43.9
1912.....	19.7	110	44.9	1916.....	17.4	100	44.8
1913.....	19.4	101	40.6	1917.....	14.7	123	41.5
1914.....	19.8	110	43.7				

The first thing that arrests the attention is the height of the neonatal rate. During the seven-year period it never fell below a third of the infantile mortality rate, which varied from 100 in 1916 to 132 in 1915, and averaged 113. It marked out the first four weeks of life as by far the most fatal time in all postnatal life.

The second is that the neonatal rate does not vary *pari passu* with the infantile one. In 1916 the neonatal rate was almost at its highest level, 44.8, while the infantile rate was at its lowest, namely, 100. In 1913, however, with an infantile rate of 101, the neonatal rate was only 40.6.

A third point that invites attention is the comparison of the rates in legitimates and illegitimates. This is well brought out by the following tables of rates obtaining in the city of Edinburgh:

Year.	Rates for infantile mortality.			Rates for neonatal mortality.		
	Legitimates and illegitimates combined.	Legitimates alone.	Illegitimates alone.	Legitimates and illegitimates combined.	Legitimates alone.	Illegitimates alone.
1915.....	132	130	151	43.9	42.7	56.6
1916.....	100	99	110	44.8	49.4	47.4
1917.....	123	113	212	41.5	38.0	76.0

It is quite clear that the neonatal rate must be scrutinized not only from the point of view of legitimacy and illegitimacy but from all other aspects—of housing, alcoholism, bottle and breast feeding, etc.

The fourth matter which must engage careful attention is prematurity of birth. Of the neonatal deaths in Edinburgh for the years 1915–1917 nearly one-half were attributable to premature birth. There is a considerable difference, however, between what a baby is said to have died of and the conditions which would be found on post-mortem examination. In a sense the approximate 50 per cent of neonatal deaths are due to prematurity of birth, but hardly in any case is it the sole cause; alongside of it is nearly always something else, and something which the death certificate rarely names.

In the same way, other alleged causes of neonatal death, such as atrophy, marasmus, and debility would, on close inspection, be found to be translatable into other medical terms and to represent other and much more definite morbid conditions.

Factors in Infantile Mortality.

Ballantyne gives the following summary of the factors involved in infant mortality:

- (a) The antenatal factor, determined by placenta.
- (b) The intranatal factor, injuries in child birth.
- (c) The postnatal factor, the germ-laden environment.
- (d) A complexity of causes.

The causes of antenatal death are comparatively simple in action and reach the unborn infant through the placenta. The fatality in such cases is largely decided by the state of that organ.

The causes of intranatal death are more complicated. They represent a noncompatibility between the child about to be born and the powers by which its birth is to be effected. The causes of intranatal death can, to a great degree, be anticipated, and in many cases they can be defeated by good obstetrics.

The causes of neonatal death are far more complicated and are much less easy to master either in the sense of understanding or combating them.

IMPORTANT PRECAUTIONS IN ADMINISTERING ARSPHENAMINE AND NEOARSPHENAMINE.

Experience has shown that the untoward results occasionally associated with the administration of arspenamine are due in a large measure to the use of too highly concentrated solutions of the drug, to too rapid administration, and to insufficient care in rendering the solution slightly alkaline.

The reader, therefore, may be interested in studying the following instructions just issued to medical officers of the Public Health Service regarding the administration of arsephenamine and neoarsphenamine. Careful observance of the precautions here described will reduce the number of reactions from the use of these drugs.

GENERAL DIRECTIONS.

The ampule, before opening, should be immersed in 95 per cent alcohol for 15 minutes in order to detect any crack or aperture not primarily recognizable. (Should such a breach be discovered, the contents of the ampule should be discarded.)